

### ABSTRACT OF THE INVENTION

Vitamin D-binding protein (Gc protein) and its small domain (approximately 1/5 of the Gc peptide also known as domain III) were cloned via a baculovirus vector. The cloned Gc protein and the cloned domain (Cd) peptide were treated with immobilized  $\beta$ -galactosidase and sialidase to yield macrophage activating factors, GcMAFc and CdMAF, respectively. These cloned macrophage activating factors and GcMAF are to be used for therapy of cancer, HIV-infection and osteopetrosis, and may also be used as adjuvants for immunization and vaccination.